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10/565,284

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EXAMINER

GARCIA, CARLOS E

ART UNIT

PAPER NUMBER

2627

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,284

Applicant(s)

NAKAKITA ET AL.

Examiner

CARLOS E. GARCIA

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. The finality of the last office action mailed on 9/26/2008 has been withdrawn, due to having a reference with a date that does not anticipate the Applicant's foreign priority date. A new final rejection is hereby presented based on the last amendment filed on 6/25/2008.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP 2003-278063, filed on 7/23/2003.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3-4, 7-8, 11, 14, 16-17, 20-21, 24, 27, 29-30, 33-34 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Mundt et al. (US 2002/0145828; hereinafter Mundt).

Re claims 1, 14 and 27: Mundt discloses a negative pressure utilization type of slider (as shown in Fig.1-12) comprising: a head (see para.0018, 0037) for recording onto a disk or reproducing from a disk 107; and an air bearing surface (the air bearing surface is composed of all surfaces facing the disk medium) for facing a disk, the air bearing surface comprising a plurality of flat surfaces (as shown in Fig.12), the substantially flat surfaces differing in height from each other (such as in Fig.3 for example), for generating

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an air flow when such disk rotates, thereby causing the slider to float over such disk, the air bearing surface having an air inflow surface (surface 1132 in Fig.12 which is located on the leftmost (air inflow) position of the slider 1200), a positive pressure generating surface (surface 1132 of cavity dam 1130 defined by wall 1160) and a negative pressure generating surface (either of surfaces 1144 or 1149), respectively, in order from an air flow incoming end to an air flow outgoing end of the slider (represented by the direction of airflow in Fig.12) wherein the air inflow surface has a groove 1280 extending between, and including, a disk inner peripheral end and a disk outer peripheral end of the air inflow surface (Fig.12), a bottom surface of the groove being lower in height than the air inflow surface relative to a surface opposite the disk-facing surface (see para.0064), the groove being set back from the air flow incoming end, such that it does not contact an edge of the air flow incoming end (see para.0060-0064).

Re claims 3, 16 and 29: Mundt further discloses wherein the bottom surface of the groove is flush with, and the same height as, the negative pressure generating surface (as shown in Fig.12; bottom surface of 1280 is at the same level as surfaces 1144 and 1149).

Re claims 4, 17 and 30: Mundt further discloses wherein the air inflow surface extends to the air flow incoming end (in Fig.12; the frontal air inflow surface 1132 as defined above, extends towards the air inflow edge of the slider defined by surfaces 1152).

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Re claims 7, 20 and 33: Mundt further discloses wherein the head is a magnetic head (para.0018).

Re claims 8, 21 and 34: Mundt further discloses wherein the head comprises a magnetoresistive element (para.0018).

Re claims 11, 24 and 37: Mundt further discloses a disk device including the slider according as discussed above (Fig.1).

Claims 1-2, 4, 7-8, 11, 14-15, 17, 20-21, 24, 27-28, 30, 33-34 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Boutaghou et al. (US 2003/0058578; hereinafter Boutaghou).

Re claims 1, 14 and 27: Boutaghou discloses a negative pressure utilization type of slider (as shown in Fig.1-4) comprising: a head (see para.0031) for recording onto a disk or reproducing from a disk 107; and an air bearing surface (the air bearing surface is composed of all surfaces facing the disk medium) for facing a disk, the air bearing surface comprising a plurality of flat surfaces (as shown in Fig.2), the substantially flat surfaces differing in height from each other (such as in Fig.2 for example), for generating an air flow when such disk rotates, thereby causing the slider to float over such disk, the air bearing surface having an air inflow surface (surface 242 in Fig.4 which is located on the air inflow area of the slider 200), a positive pressure generating surface (top surface 234 of cavity dam 232 defined by edge 236) and a negative pressure generating surface

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252, respectively, in order from an air flow incoming end to an air flow outgoing end of the slider (represented by the direction of airflow in Fig.4) wherein the air inflow surface has a groove 270 extending between, and including, a disk inner peripheral end and a disk outer peripheral end of the air inflow surface (Fig.2), a bottom surface of the groove being lower in height than the air inflow surface relative to a surface opposite the disk-facing surface (shown in Fig.2), the groove being set back from the air flow incoming end, such that it does not contact an edge of the air flow incoming end (see para.0042-0054).

Re claims 2, 15 and 28: Boutaghou further discloses wherein the air bearing surface has surfaces of three stages differing in height, the surfaces of the three stages comprising an upper stage surface highest in height, a lower stage surface lowest in height and a middle surface lower than the upper stage surface and higher than the lower stage surface, the positive pressure generating surface, the air inflow surface and the negative pressure generating surface being formed on the upper stage surface, the middle surface and the lower stage surface, respectively (illustrated in Fig.2).

Re claims 4, 17 and 30: Boutaghou further discloses wherein the air inflow surface extends to the air flow incoming end (in Fig.4; surface 242 extends towards the air inflow edge of the slider defined by leading edge 254).

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Re claims 7, 20 and 33: Boutaghou further discloses wherein the head is a magnetic head (para.0031).

Re claims 8, 21 and 34: Boutaghou further discloses wherein the head comprises a magnetoresistive element (para.0031).

Re claims 11, 24 and 37: Boutaghou further discloses a disk device including the slider according as discussed above (Fig.1).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5, 9-10, 18, 22-23, 31 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mundt or Boutaghou in view of Applicants Admitted Prior Art (AAPA). The teachings of Mundt and Boutaghou have been discussed previously.

Re claims 5, 18 and 31: Mundt or Boutaghou disclose the claimed invention except for the groove is located at least 20 μm from the air flow incoming end.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the distance between the groove and the air flow incoming edge of Mundt or Boutaghou, to a small value for the purpose of minimizing the overall

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size of the slider, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Re claims 9-10, 22-23 and 35-36: Mundt or Boutaghou disclose the claimed invention except for the air bearing surface having an area of not more than 1 mm^2 or 0.5 mm^2 .

It would have been an obvious matter of design choice to use a standard femto-slider with dimensions of $0.7 \times 0.87 \text{ mm}$ which would have an air bearing surface area of around 0.609 mm^2 , since such a modification would have involved a mere change in the size of a component for the purpose of evaluating the relationship between the air bearing surface and the atmospheric pressure variation using the next generation slider, such as the femto-slider. Furthermore, absent a statement of criticality, a change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

7. Claims 6, 12-13, 19, 25-26, 32 and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mundt or Boutaghou in view of Applicants Admitted Prior Art (AAPA). The teachings of Mundt and Boutaghou have been discussed previously.

Re claims 6, 19 and 32: Mundt or Boutaghou disclose the claimed invention except for wherein the groove has a width of at least $30 \text{ }\mu\text{m}$.

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the groove as shown by Mundt or Boutaghou to be at

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least 30 μm in width since in the AAPA (Spec. page 21, lines 1-3) the standard femto-slider dimensions are 0.7 x 0.87 mm, the groove which extends from one inner peripheral end to an outer peripheral end of the slider must be at least 30 μm in order to obtain a slider with a groove which extends from one end for a standard femto-slider.

Re claims 12-13, 25-26 and 38-39: Mundt or Boutaghou further disclose means for recording or reproducing or both recording and reproducing in a disk region (as discussed above, the means for recording/reproducing is performed by a read/write head).

Mundt or Boutaghou discloses the claimed invention except for a relative speed between the slider and the disk is not higher than 10 m/s or 7 m/s.

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the relative speed between the slider and the disk to achieve a desired density recording/reproducing and/or to change the flying height of the slider due to the groove configuration surface in both the low and high speed regions of a disk region, as disclosed in AAPA (see Spec. page 19, lines 10-32) since the change of positive pressure in the groove configuration surface affects the floating height of the slider.

Response to Arguments

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.
10. Applicant's amendment filed 6/25/2008 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos E. Garcia whose telephone number is 571-270-1354. The examiner can normally be reached on 8:30 am to 5:00 pm, Monday thru Thursday and 8:30 to 4:00 pm, Fridays. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea Wellington can be reached on 571-272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Carlos E Garcia/
Examiner, Art Unit 2627

1/13/2009

/Andrea L Wellington/
Supervisory Patent Examiner, Art Unit 2627